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ABSTRACT

Activities of the Scottish Microelectronics Development Programme (SMDP) related to the introduction and coordination of educational microcomputing in Scotland from 1980 to February 1984 are described. The background of the program is outlined, and it is noted that SMDP has become a division of the Scottish Council for Educational Technology (SCET), operating as the main executive arm of a new Microelectronics in Education Committee (MEC). Also described are the Support Software Library, a collection of educational software developed by SMDP programmers and freely distributed to Scottish schools, and SMDP information dissemination activities. Additional activities and projects described are the Primary Software Development Project, which produces programs for use in primary schools; the Edinburgh Software Project; the Scottish Community Education Microelectronics Project (SCEMP), which is funded by the Scottish Education Department and the Scottish Community Education Council to increase general community awareness of the potential scope of microcomputers; the Schools Computer Administration and Management Project (SCAMP), aimed at the computerization of secondary school recordkeeping/administration; and two special education projects for the mildly mentally handicapped. Appendices present a list of SMDP publications, a sample order form, a list of SMDP software distribution centers, and annotated listings of software in the Supported Software Library and SCEMP software. (ESR)

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ABOUT
THE
SCOTTISH MICROELECTRONICS
DEVELOPMENT PROGRAMME
February 1984

distributed by the

**SCOTTISH MICROELECTRONICS
DEVELOPMENT PROGRAMME**

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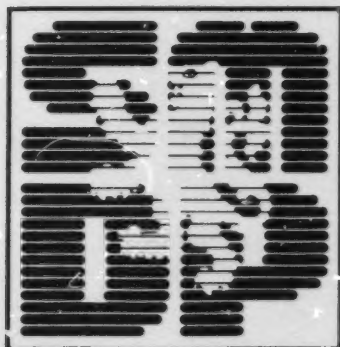
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1. BACKGROUND

In 1979 a survey showed that there were few microcomputers in schools, some access to mainframe terminals and very little good educational software. In 1980 the Government set up a Scottish Microelectronics Development Programme (SMDP) to create an awareness of microelectronics in schools. SMDP was given a budget of one million pounds, for the four years to March 1984, and David Walker, who had conducted the 1979 survey, was appointed Director. Microcomputers were loaned to 68 schools and other educational institutions where some expertise and enthusiasm had been established, with the aim of generating good software under the guidance of SMDP programming staff. Early steps were taken to set up a first tier library of contributed software and other software was accumulated from numerous sources until by 1982 SMDP had a substantial collection of programs.

In 1982, a smaller library of SMDP supported software was established. This supported software library, which is now growing rapidly, is distributed throughout Scottish education (see section 2). In addition, a quarterly newsletter, Phase Two, is circulated to keep subscribers in touch with developments and a number of occasional papers have been produced (see section 3).

In 1982 the local authorities and the SED jointly proposed a National Plan to co-ordinate all activities in educational microelectronics. This was well received by all sectors of education and the Secretary of State invited the Scottish Council for Educational Technology (SCET) to set up a national co-ordinating body. This was established in November 1983 as the Microelectronics in Education Committee (MEC) with a local authority chairman and strong representation from local authority, teacher training and curriculum interests as well as University, Further and Higher Education colleges, the Microelectronics Educational Development Centre (MEDC) and teacher unions with assessors from government departments. SMDP became a Division of SCET as the main executive arm of the new committee with a remit for a National Software Library, a National Information Service and a Research and Development function. The first two areas of SMDP activity are described briefly in the following two sections. These, together with the Research and Development function, are developing as the new MEC becomes established.

2. SUPPORTED SOFTWARE LIBRARY

This library is based on agreement with the Convention of Scottish Local Authorities (COSLA), that software is freely distributed within Scottish education. The software is developed by SMDP programmers to specifications written by groups of teachers. Programs are tested in the teachers' schools and amended by the programmers. Documentation is written to the SMDP Interim Standard of Documentation and includes Pupil, Teacher and Technical notes. Recent programs also conform to the SMDP Interim Presentation Standard. When programs are considered to be complete, they are distributed to Regional Centres throughout Scotland.

These Regional distribution centres* were established in May 1982 to coincide with the launch of the Supported Library, following agreement with COSLA. A complete set of the Supported Software Library is maintained at each Centre for local distribution, with SMDP distributing new and updated programs to the Centres.

The Library currently contains programs for Apple, BBC, Commodore Pet, Cromemco, RML and Sinclair Spectrum microcomputers. Programs are translated from one machine to another in response to demand and will be written for new types of machines as they come into use in Scottish education. Programs in the library also cover a wide range of subjects and the levels range from early Primary Education to Further Education.

It is accepted that programs in the Supported Software Library reach high educational and technical standards; negotiations are currently underway to publish the programs for sale internationally. A full catalogue of the software is available from SMDP (see Appendix 1) and a shortened list of the software is at Appendix 3.

* See Appendix 2

3. INFORMATION DISSEMINATION

A display area at SMDP with relevant books and periodicals is open to anyone with an appointment for browsing purposes. A wide variety of microcomputers, including the ones mainly in use in Scottish education are also housed at SMDP, primarily for use by the programming staff.

SMDP produces a number of publications as well as a Periodical, Phase Two, as part of the campaign to co-ordinate and disseminate information throughout Scotland. These publications range from user guides and occasional papers on software development to the SMDP software catalogue and documentation standards. Phase Two has been produced for three years and covers many informative articles by those involved in developing the use of microcomputers in their school or college. It contains articles of current discussion, such as the 'which language' debate and reviews of software, books and hardware. There are regular features, including monitoring of other journals and it also always contains news about latest developments and activities at SMDP. Scottish Regions are increasingly using Phase Two to announce their developments in microcomputing. A list of articles contained in past issues or a free complementary copy of Phase Two is available from SMDP. (An order form, for publications and Phase Two subscription, is at Appendix 1.)

SMDP also sends information as well as SMDP software to Regional Centres. Some Regions have established Preview Centres for teachers to visit, others send information to individual schools. All centres are frequently in contact with SMDP and regularly exchange information. In addition to information exchange and dissemination within Scotland, links are being established by SMDP with agencies in many other countries.

4. ADDITIONAL ACTIVITIES AND ASSOCIATED PROJECTS

a) Primary Software Development Project

SMDP is co-ordinating a software development project which will produce programs for use in primary schools. With the co-operation of the local authorities involved it was possible during May 1983 to identify those Regions which would participate and the teachers who would form the project team. The teachers' introduction to the project consisted of their attendance at a week long residential in-service course held at Stirling University in early June.

Since then, the teachers have been meeting in small groups together with programmers from SMDP and, where appropriate, other specialist consultants. Initially the purpose of these project meetings was to discuss and produce program specifications, which were taken away and translated into programs by SMDP. Project meetings now have a variety of functions:

- i) to discuss and write new program specifications;
- ii) to discuss programs written by SMDP and arrange field testing;
- iii) to write and discuss necessary program documentation;
- iv) to agree on work to be done by the next meeting.

An Advisory Committee has been formed and two of its most important roles are:

- i) to maintain contact with other groups working in this field and so to avoid duplication of effort;
- ii) to monitor the progress being made by the project and to advise on, for example, any curricular areas which may be receiving less attention than others.

Software produced by this project will be distributed throughout Scotland as part of the SMDP Supported Software Library.

b) Edinburgh Software Project

To facilitate software production, the Department of Trade and Industry are funding SMDP to run an Edinburgh-based Software Project. It aims to produce 25 additional programs for the SMDP supported software library in each of the academic sessions 1982-83 and 1983-84 in a similar way to the Primary Software Development Project (above). Over 40 programs were produced by the Project in 1982-83 and these have been distributed to Regional centres throughout Scotland, in the usual way.

c) The Scottish Community Education Microelectronics Project (SCEMP)

The Scottish Community Education Microelectronics Project (SCEMP) is funded by the Scottish Education Department and the Scottish Community Education Council to increase general awareness of the potential scope of the microcomputer as a community resource. The project is exploring how microcomputers can be used:

- i) to provide information within a variety of community settings;
and
- ii) to create opportunities for individualised learning within community education.

Since its inception in 1981, it has published three reports describing a variety of activities which include collaborations with libraries, health boards, community education services and voluntary organisations. SCEMP has also set up exhibitions to give the general public a 'hands-on' experience of computers using friendly, robust programs.

SCEMP activities aim to:

- i) provide a national focus for computers in community education by collecting, collating and disseminating information, including a database describing suitable software;
- ii) provide advice and information in response to the needs and demands of the community education field;
- iii) encourage, through advice, support and placement of computers, local initiatives involving the use of computers in administration, information services and in computer assisted learning;
- iv) encourage the development and evaluation of appropriate computer programs for use in community education;
- v) advise on the training of community educators on uses of computers.

Through SCEMP, the community is being given an opportunity to assess the potential of the computer as a community resource in the most effective way. A list of SCEMP software is at Appendix 4.

d) The Schools Computer Administration & Management Project (SCAMP)

SCAMP has come about due to the increasing interest shown by administrators in education in how they might realise the benefits that the computer has to offer.

It is aimed directly at the systematisation of secondary school record keeping/administration and in so doing provides for the internal information needs of the school while at the same time taking account of the need to service Regional and other agency requirements. To achieve this, different Phases of the Project have been addressed to different application sets, all of which will run on the new powerful school based microcomputer systems now provided by the Department of Trade and Industry.

The application sets relating to Phases I and II are listed below:

SCAMP Phase I: - Initialisation: the ability to define the school in terms of its basic administrative parameters, e.g. associated primary schools, register classes, house systems, courses offered and so on. This exercise forms the basis of the whole SCAMP system.

- Class Formation
- Course Allocations
- Marks Processing: MODE A - Norm Referenced Processing
- The Pupil Record

SCAMP Phase II: - Staffing
- Statistics
- Organisation of Subject Departments
- School Timetabling Aids
- Electronic Examination Entry
- Electronic Examination Board Results Returns
- School Attendance
- Extensions of the Course Allocation Application
- Library System

Ten schools are receiving Future Technology systems, funded by the Department of Trade and Industry. The Scottish Regional Authorities are involved in this project and a central support team, comprising a project director, systems analyst and secretary, is based at SMDP.

This new dimension to SCAMP follows from the co-operation and research and development carried out over a number of years by Central Region, Fife Region and the Scottish Education Department - in association with SMDP.

This project is widely regarded as the most advanced of its kind in Europe and will allow education authorities to provide, from a single data base, all the administrative needs of a secondary school.

e) Special Education

i) Development Centres:

Three schools have been selected for special education, one each in the North, East and West of the country, to become development centres as models for other schools to follow and for referral. Each centre has been equipped with the most modern electronic teaching facilities, including individual pupil microcomputers, concept keyboards, monitors, printers, Turtles, Buggies, video cameras and the latest interactive video disc technology. Each classroom will have video projection on to a 5' square screen linked to individual VDU's. A full-time development team will guide progress.

ii) MicroSpecial Starter Pack:

Following on from a), DTI propose to provide all schools for the mildly mentally handicapped in the UK with a microcomputer and associated peripherals. SMDP is engaged in preparing a 'MicroSpecial Starter Pack' to accompany the DTI package. This will include at least 20 computer software packages, articles, case studies, notes on the use of micros in Special Education, with recommended specification, documentation, interface and presentation standards. Appropriate teacher training will be given. The 'pack' will be tested in the Development Centres described at a) above and will be ready when DTI release the hardware to schools in 1984.

5. FOR FURTHER INFORMATION

Further information about SMDP may be obtained from the Information Officer, SMDP, 74 Victoria Crescent Road, Glasgow G12 9JN. Tel: 041 357 0340.

SMDP PUBLICATIONS

<u>Publication</u>	<u>Author</u>	<u>Price</u>
About SMDP	SMDP	Free
*Computer Studies Course (includes disc for Apple II)	SCEG	£3.50
*Computer Appreciation Course (includes 4 discs for RML 380Z)	Education for the Industrial Society Project	14.00
SMDP Interim Presentation Standards	SMDP	1.54
Interfacing Extracts	SSSERC	0.40
The Apple Handbook	George Laidlaw	0.35
An Illustrated Guide to Software Development	Angus McGill	0.50
Program Documentation: Interim Standards	SMDP	1.70
Educational Computer Package Evaluation and Design	W T Beveridge, HMI	0.55
Teaching Physics by Microcomputer	Walter J McCulloch and Ian S Carnegie	0.65
The RML 380Z Handbook	Fife Regional Council	1.00
The MEDC Interface and the Apple II Microcomputer	R A Sparkes	1.30
What if ... and All That?	C Tomasso	0.50
The 380Z First Line Maintenance	Fife Regional Council	2.00
The Cromemco 2 User's Guide	Alistair J Fyfe	0.65
Making Noises with the Cromemco System 2	Alistair Thomson	0.30
Guidelines for the Design of Computer Programs for Community Use	SCEMP	0.65
Notes on the Spectrum	R A Sparkes	0.65
Annual subscription to <u>Phase Two</u> (four issues)	SMDP	4.00

SMDP Catalogue of Supported Software is available from Regional Distribution Centres. (A list of Centres may be obtained from SMDP, on request.)

Copies of publications may be ordered by sending this order to the Information Officer, SMDP, 74 Victoria Crescent Road, Glasgow G12 9JN. Please circle the cost of items required and write your address in block capitals.

NAME:

INSTITUTION:
(if appropriate)

ADDRESS:

.....

.....

DATE:

Phase Two 70/419
Publications 70/420

Notes:

1. 30p postage and package will be added to all orders sent by post.
2. Please send no money now: you will be invoiced.
3. Subscribers to Phase Two will automatically be sent renewal notices on expiry of subscriptions.
4. The rates for multiple copies of Phase Two are as follows:

2 - 5 copies - posted to one address	£3.80 per annum
6 - 30 copies - posted to one address	£3.60 per annum
31 - 60 copies - posted to one address	£3.40 per annum
61 - 299 copies - posted to one address	£3.00 per annum
300 + copies - posted to one address	£2.50 per annum
5. Publications marked with an * are available only within Scottish education.

SMDP SOFTWARE DISTRIBUTION

Teachers within Scottish education interested in acquiring SMDP Supported Software are asked to contact their local distribution centre. Within Strathclyde Region, software may be viewed at Preview Centres prior to purchase from the Distribution Centre.

REGION	NAME OF CONTACT AND CENTRE	ADDRESS AND PHONE	NOTES
BORDERS	Mr P Barker Moray House College of Education	Holyrood Road Edinburgh EH8 8AQ 031-556 8455	Also a support centre for Lothian
CENTRAL	Dr M Sharp Falkirk College of Technology	Falkirk 0324 24981	
DUMFRIES & GALLOWAY	Mr G Cockburn Dumfries Technical College	Heathhall Dumfries 0387 61261	
FIFE	Mr B Taylor The Microcomputer Unit Fife Educational Resources Centre	Ramsay Road Kirkcaldy, 0592 267272	
GRAMPIAN	Mr G Bell & Mrs L Steven, GEM Project	Teachers' Resources Centre St Paul Street Aberdeen AB1 1DA 0224 630608	
HIGHLAND, ORKNEY SHETLAND, WESTERN ISLES	Mr N Smart Computer Centre Aberdeen College of Education	Hilton Place, Aberdeen AB9 1FA 0224 42341	
LOTHIAN	Mr C Maclean Dean Education Centre	Belford Road Edinburgh EH4 3DS 031-343 1931	Primary/ Secondary Education
	Mr B Smith Napier College	Collinton Road Edinburgh EH10 5DT 031-447 7070	Further Education
	Mr P Barker Moray House College of Education	Holyrood Road Edinburgh EH8 8AQ 031-556 8455	Support centre
STRATHCLYDE Ayrshire	Mr S Pentleton Newton Adviser's Centre	Green Street Lane Ayr KA8 8BH 0292-260325	Preview Centre
Dunbarton	Mr I Glen Dalmuir Resource Centre	Singer Road, Clydebank, 041-952-0301	Preview Centre
Glasgow	Mr J Izat & Mr R Stuart Microcomputer Development Centre Dundas Vale Teachers' Centre	6 New City Road Glasgow G4 9JR 041-332-6762	Preview Centre
Lanark	Mr J Stewart Larkhall Academy	Cherryhall Larkhall Lanarkshire ML9 1QN 0698-881570	Preview Centre
Renfrew, Argyll & Bute	Mr W Connolly & Mr R Tennent Robertson Centre	16 Glasgow Road Paisley PA1 3QG 041-887-3726	Preview Centre
	Mr J Hawthorn Jordanhill College of Education	Southbrae Drive, Glasgow G13 1PP 041-959 1232	Distribution Centre
TAYSIDE	Mr T Smith Adviser in Computer Education	Floor 8, Tayside House Dundee 0382 23281 ext 3298	
	Mr S McMeeken Computer Centre Dundee College of Education	Gardyne Road Dundee DD5 1NY 0382 453433	Support Centre
CENTRAL INSTITUTIONS and UNIVERSITIES	Mr D Ord- Computer Centre Dundee College of Technology	Bell Street, Dundee, DD1 1HG 0382 27225	

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SCOTTISH MICROELECTRONICS DEVELOPMENT PROGRAMME

LIST OF SOFTWARE IN THE SUPPORTED SOFTWARE LIBRARY

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|-----|--|--|--|
| 1. | SELF-INSTRUCTIONAL BASIC:

Beginner Computing | APPLE
PET
RML | A structured approach to self-learning of BASIC, this suite of programs incorporates ten programming 'sessions' with ten audio tapes. It is a careful approach which takes non-programmers through all the necessary stages to elementary programming. |
| 2. | OBJECTIVE QUESTIONS FRAMEWORK:

Any level
Non Subject Specific | APPLE
PET
RML
CROMEMCO
BBC | Experience shows that there is always a demand on the time of the school's computer expert to provide assistance to his colleagues who are not computer literate. This package is designed for use by those teachers who wish to use computers but do not wish to be programmers. It is based on a series of multiple choice questions set by the teacher and can provide class and individual results. |
| 3. | ARITHMETIC TUTOR:
Primary V-VI,
Primary VII Remedial
Secondary I or II Remedial
Arithmetic | APPLE | Addition, subtraction, short multiplication, and short division are all covered by this package which can offer a data file of a very large number of questions on a class basis. The package also retains on disc a number of records relating to the management of the class on an individual pupil basis including each score and cumulative totals. Should the teacher not wish to set the questions then they can be randomly generated. |
| 4. | SMOP SIMPLIFIED WORD PROCESSOR:

O Grade/General
Business Studies /
Secretarial/Computing | APPLE
BBC
PET
RML | It is strongly felt that the introduction of a commercial word processor into the classroom is totally inappropriate in view of the normally extremely large number of functions which they can perform. It is generally accepted that what is required is a word processor demonstrator/tutor and this package sets out to meet that need. |
| 5. | TRANSLATION:

Utility | RML to
APPLE | This utility reads the program transferred from the RML 380Z to the Apple and translates most of the RML 380Z BASIC into a format which is capable of execution by the Apple with minimum editing. |
| 6. | DATA COMMUNICATION:

Utility | APPLE
PET
RML
CROMEMCO | Following constant complaints about the incompatibility between various computers SMOP staff set out to write utilities which would allow the transfer of text files and programs between microcomputers not necessarily of the same make. This is currently available for the Pet, Apple, Cromemco and RML 380Z. This overcomes the need to input the code via the keyboard but all the normal editing from one language to another still requires to be carried out. |
| 7. | WORD INVADERS 2.00:

P1-P7/Remedial Secondary
English | APPLE
BBC
PET | By using the concept of the popular space invaders game this package allows the teacher to set a series of problems in spelling to be solved by the pupils using techniques which are already second nature to them and which are associated with pleasure in their free time and not with the school regime. |
| 8. | EQUATION INVADERS:

Primary & Remedial
Mathematics | APPLE
PET | This package is a mathematically based version of the Word Invaders program described on the previous page. |
| 9. | FIFE DIET:

SCE O & H Grades
Home Economics | APPLE
RML
CROMEMCO | The program is designed to provide advice and first hand experience in constructing diets, and is intended to be used primarily by O and H grade pupils. |
| 10. | FIFE HIGHER DIET:

SCE O & H Grades
Home Economics | APPLE
RML
CROMEMCO | This package is similar in concept to FIFE DIET but is specifically aimed at H grade Home Economics (Food and Nutrition) pupils. |
| 11. | FIFE BREAK-EVEN POINT:

SCE O & H Grades
Accounting | APPLE
RML
CROMEMCO | This program allows H grade pupils to calculate the level at which the revenue from sales is just adequate to cover the cost of a commodity. |

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|--|--------------------------|---|
| 12. FIFE DEPRECIATION:

SCE O & H Grades
Accounting | APPLE
RML
CROMEMCO | Pupils using this program, which is designed for the H grade syllabus, have a choice between straight line or diminishing balance methods of calculating depreciation. |
| 13. MILLIKAN OIL DROP
EXPERIMENT:
SCE H Grade
Physics H Grade | APPLE | There are undoubtedly many areas where the computer is tailor-made to solve existing problems. Within the secondary school environment the most celebrated example of such a problem is the Millikan Oil Drop Experiment. Although the experiment is specifically mentioned in the syllabus it is widely accepted that few schools are successful in carrying it out. This simulation provides data similar to that produced in the experiment proper. |
| 14. SECURITY:

Systems Utility | APPLE
RML | A large number of teachers have expressed a desire to protect their discs. This package offers them a simple but effective way of achieving this. |
| 15. MIXING TEXT/GRAPHICS:

Systems Utility | APPLE | It became evident very early on in the life of SMDP that the Apple's inability to allow text and graphics on the same screen has caused considerable problems to teachers. This package was undertaken to solve this problem. |
| 16. THE ELEMENT GAME:
Any
Chemistry | APPLE | The very popular animal game has been taken as the basis for this package. By asking the pupil to reverse the normal practice and to 'teach' the computer, the teacher can not only confirm the fact that the knowledge is held but receives a valuable insight into the manner in which the information is perceived. |
| 17. ELECTION SIMULATION:

SCE O & H Grades
Business Studies | APPLE
RML | This program is a simulation of up to four Parliamentary Constituencies in a General election. It is designed to show the impact on a constituency of the local character and conditions as well as party policies. |
| 18. SPELLSTRING:
Child/Adult
English | APPLE | Whereas most educational computer packages are aimed at the volume market this one is intended for those pupils or adults who have specific and recognised spelling problems, eg. "Silent K". |
| 19. QUADRATIC GRAPH:
SCE O Grade
Mathematics | APPLE | When pupils are faced with the wide range of formats in which a quadratic expression can be written, it can be difficult for them to appreciate that all the formats have the same basic graph shape in common. This program allows pupils to investigate the effect of changing different parameters to the basic quadratic equation in order to demonstrate the inherent similarity between the various apparently different formats. |
| 20. TRANSFORMATION GEOMETRY:
SCE O Grade SIII-SIV
Mathematics | APPLE | The physical process of drawing the shapes on a co-ordinate diagram tend to mask the cause and effect link which is the important feature in understanding what a transformation is and what it does. This program performs the mechanics of the transformation thereby allowing teacher and pupils to concentrate on the cause and effect. |
| 21. BENDING MOMENT DIAGRAMS:
Further Education
Engineering | APPLE | The more glamorous uses of the computer as viewed by the general public would undoubtedly include computer aided design - usually of sophisticated motor cars. Computer aided design is extensively used where there are time and cost constraints but safety is still essential. This package is designed to introduce the concept to FE students by allowing analysis and comparison of specific beam conditions by displaying bending moment diagrams. |
| 22. VELOCITY/ACCELERATION
MEASUREMENT:
O Grade
Physics | APPLE | Most people, irrespective of whether or not they have come in contact with a computer have a basic conception of what it is and what it can do. It would be fair to say however that few of the uninitiated would consider the computer as a simple but unnervingly accurate timing and recording device. This package is designed, by means of velocity and acceleration measurement, to introduce pupils to the computer as a laboratory tool. |
| 23. ENLARGED CHARACTER
FACILITY:
Any
Systems Utility | RML | A visit to a school catering for visually handicapped (sight impaired) children resulted in this package being prepared although it can also have advantages where pupils are sitting far from the screen or extra emphasis is desired. The package enables any piece of text to be enlarged and presented in various positions on the screen. |

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| 24. STRING HANDLING DEMONSTRATION: Introductory Computing | RML | To provide teachers with demonstration programs which allow them to introduce the string handling facilities of RML BASIC while the computer provides graphic illustrations of the techniques being discussed. |
| 25. PATCHIT.100: Systems Utility | CROMEMCO | This program enables the user to inspect each sector of a Cromemco configured disc and change the contents if desired. |
| 26. COPY23. 104: Systems Utility | CROMEMCO | After receiving numerous complaints from teachers relating to the extremely slow transfer program available for the Cromemco it was decided to write our own in-house version. This program is based on track to track copy. |
| 27. BOATRACE: SI, Less able SII Foundation Course Mathematics | CROMEMCO | This is an interesting and unusual simulation in that it requires the pupils to carry out mapwork using protractors and rulers, between consultations with the computer. This is very much the real life situation where one needs to consider carefully what is required of the computer prior to its use as opposed to straight question and answer techniques. The package is designed to encourage accurate measurements with both protractor and ruler and an understanding of 3 figure bearings. |
| 28. AIRLINE RESERVATION PACKAGE: SCE O Grade Computing | APPLE
PET
RML | One of the main uses of computers is to store and access important information which may be changing from minute to minute. Teaching about real-time systems can be very dry without a practical demonstration and it can be difficult to explain the range of programs and facilities which are required to sustain a rapidly changing bank of data. The Airline Reservation Package was written to overcome these problems and to present the topic in an interesting context and in a practical manner. |
| 29. FIFE STANDARD LETTER PROGRAM: SCE O Grade Business Studies | RML | This program simulates some of the characteristics of word-processors and will give pupils 'a taste' of the capabilities of these machines. The program is suitable for pupils studying Higher grade Secretarial Studies. Pupils should produce letters from the examples given, additional examples can be supplied by the teacher. |
| 30. SINUSOIDAL FUNCTIONS: SCE O Grade Mathematics, Physics and Engineering | APPLE | <p>The effects of the constants in the equations:</p> $Y = K \sin A(X+B)+C$ $\text{and } Y = K \cos A(X+B)+C$ <p>are difficult to demonstrate. The teacher or pupil becomes involved in the mechanical process of curve drawing, which, although a valid activity, is time-consuming and distracts the pupils from the main point, which is the understanding of the effects of the individual constants on the curves $Y = \sin X$ and $Y = \cos X$. Sinusoidal Functions demonstrates the effect of each of the above constants on the trigonometric functions.</p> |
| 31. SYSIM: CSYS, HC, HD, Undergraduate Mathematics | APPLE | This program allows the numerical solution of systems of differential equations and the simulation of continuous systems. It provides the user with the means of computing, tabulating and plotting the numerical solutions of systems of differential equations. |
| 32. READING & SPELLING: Remedial Education Language | APPLE | A program to improve visual perception of words and phrases and speed and accuracy in reading and spelling. |
| 33. THE DEPTHS: Secondary + Game | RML | <p>This package is essentially for amusement only. However, the usual side-effects of games programs apply, i.e.</p> <ol style="list-style-type: none"> 1. To encourage pupils to use the computer 2. To persuade pupils to learn how to operate the computer 3. To reward careful tactics and sensible strategy <p>The player has a character which he moves about a maze of rooms and passages. As the character explores the maze, he encounters monsters and finds treasures. He may choose whether to fight monsters or run away from them. As he progresses, the character gains experience measured in experience points.</p> |

34. 380Z FAST DISC COPY: RML
Utility
35. RADIO TRANSMISSION: APPLE
BBC
H Grade
Physics
36. ELECTRICAL CIRCUITS: RML
SCE O/H Levels &
GCE O/A Levels
Physics/Engineering Science
37. LEAVES: APPLE
BBC
RML
Primary 6-7 and
Secondary 1-4
Environmental Studies/Biology/
Integrated Science
38. ADDING: BBC
Infants/Remedial
Mathematics
39. ALPHA SCATTERING: APPLE
BBC
O/H Grade
Chemistry/Physics
40. AREA UNDER A CURVE: APPLE
BBC
RML
SPECTRUM
H Grade
Mathematics
- Making a copy of a 380Z mini floppy disc can take up to five minutes depending on the amount of data on the user area of the disc. Distribution centres requiring to make multiple copies of discs therefore need to make copies as fast as possible. The package will also be of interest to teachers who wish to prepare multiple copies of discs for use in schools which have more than one RML 380Z system. The package can also be useful for making individual back-up discs when the discs are reasonably full.
- The program assists the consolidation of class work by allowing a pupil, or small group of pupils, to study the operation of a radio receiver by means of matched circuit diagrams and wave profiles - drawings which are awkward to produce on a blackboard or in a textbook in the correct time sequence.
- The package provides the teacher with a flexible investigative tool with which to enhance the circuit-analysis skills of classes.
- It allows the user to design and investigate simple D.C. circuits of the following types:
1. open and short circuits, (short circuits only being allowed if the battery has non-zero internal resistance),
 2. series circuits of from 1 to 4 resistors,
 3. parallel and mixed parallel/series circuits,
 4. Wheatstone bridge type circuits.
- An option exists to include the battery's internal resistance in the study. Files of circuits can be produced and stored on disc, and a facility is included to produce multiple print-outs of desired circuits.
- Many pupils find a dichotomous key, whether 'branched' or 'paired statement' difficult to follow at first. This program provides a quick and simple means of using a paired statement key by focussing the pupil's attention on one pair of statements at a time and by automatically moving on to the next pair of statements appropriate to the pupil's response for a particular leaf, until the leaf has been positively identified.
- The pupil is then prompted to refer to text books, charts, etc., to compare a diagram with the leaf to confirm identification.
- This program bridges the gap between work with concrete material and the more formal 'paper and pencil' work. It uses the symbols '+' and '=' and shows the meaning of these symbols and how the addition of two sets can be recorded.
- Until now it has been impossible to demonstrate Rutherford's scattering experiments in the laboratory or by using models. The animated graphics simulate the deflection of the alpha particles and help the pupils to visualise more clearly the experimental evidence which led to the modern nuclear model of the atom. The program presents a sequence of animations:
1. Scattering by gold foil
 2. Scattering by atoms
 3. Scattering by a single atom
 4. Scattering by a single atom showing nucleus
 5. Scattering by a single nucleus
 6. Scattering by a group of nuclei
 7. Scattering by a group of atoms (atomic picture of gold foil)
- Using the blackboard or overhead projector is only practicable to illustrate the evaluation of the approximate area of the region under a curve by dividing the area into a relatively small number of strips. The computer, on the other hand, can readily illustrate the division of the region into a relatively large number of strips and can quickly evaluate the appropriate area.

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|---|---------------------------------|---|------|------|--|-----|--|--------------|
| 41. CHANNEL CROSSING: | APPLE
BBC
RML
SPECTRUM | Simple navigation provides an application of mathematics and the computer can display in a realistic and dynamic way the effect of a planned course. The computer does not give the correct answer but acknowledges when the correct course has been planned. The program allows the user: | | | | | | |
| S3/S4
Mathematics/Simple Navigation | | <ol style="list-style-type: none"> 1. to describe a particular channel crossing in terms of the direction and magnitude of the current and the points of departure and arrival; 2. to input pre-calculated values for the magnitude and direction of the planned course; 3. to have displayed on a map the effect of the current on the planned course. | | | | | | |
| 42. COUNT:
Primary
Mathematics | BBC | Children require a variety of experiences which lead to the acquisition of the skill of counting. This program provides one such experience which is motivating and allows children, either by counting on the use of perception, to find the cardinality of sets by responding to the question "how many?" After deciding, the child types his response. If correct, the numeral appears to the right of "how many?" and a large tick accompanied by music appears. The outline of the numeral is drawn together with its written form. A bleep tells the child to place his finger at the starting point for tracing the numeral which is indicated by a flashing square. | | | | | | |
| 43. DECIMAL DEFENCE:

Secondary Remedial
Arithmetic | APPLE
BBC
RML
SPECTRUM | Pupils who have difficulty with decimal numbers need practice in recognising the place value of a digit. The program alternates this practice with a game in which they must steer a starship through the galaxy. | | | | | | |
| 44. ROAD RACE:

Secondary Remedial
Arithmetic | APPLE
BBC
RML
SPECTRUM | <p>Pupils often make errors in writing down a decimal addition in vertical form.</p> <table border="0" style="margin-left: 100px;"> <tr> <td>e.g.</td> <td>23.7</td> </tr> <tr> <td></td> <td>1.8</td> </tr> <tr> <td></td> <td><u>56.72</u></td> </tr> </table> <p>Understanding of place value is poor and clarification of the concept of place value and practice in setting down these addition sums is required. This package offers practice in setting down decimal addition sums in vertical form and clarifies ideas on place value where necessary. Success is rewarded with a game of "Road Race".</p> | e.g. | 23.7 | | 1.8 | | <u>56.72</u> |
| e.g. | 23.7 | | | | | | | |
| | 1.8 | | | | | | | |
| | <u>56.72</u> | | | | | | | |
| 45. DICE:

S1/S2
Statistics | APPLE
BBC
RML
SPECTRUM | <p>There is a definite advantage in pupils performing practical probability experiments but to perform these experiments a large number of times becomes tedious and time consuming. A simulated experiment overcomes these problems. This program may be used by the teacher to:</p> <ol style="list-style-type: none"> 1. demonstrate the rolling of two dice a selected number of times and the compiling of a frequency table of total scores; 2. display on a bar graph the experimental results; 3. display the table of relative frequencies. | | | | | | |
| 46. DIFFERENCE:
Infants/Remedial
Mathematics | BBC | This program shows in a dynamic way the comparative aspect (difference between) of subtraction. It demonstrates the association of the '-' symbol with comparison and gives children practice in counting the number of objects in a set. | | | | | | |
| 47. DISASSEMBLER:
Utility | BBC | This package allows programs written in 6502 machine code on the BBC microcomputer to be disassembled and if required, dumped to a printer. | | | | | | |
| 48. GRID REFERENCES:
S1
Geography | RML | This program was written to help in the logical development of the topic, building up from 4-figure grid references with prompts to help the user, to 6-figure grid references without prompts. | | | | | | |
| 49. IDENTIFY:
Infants/Remedial
Mathematics | BBC | <p>The program offers an attractive way of providing the repetitive practice in recognising shape names which some children need as a follow-up to oral teaching and activities involving handling of actual shapes. Use of the program should help children to:</p> <ol style="list-style-type: none"> 1. recognise and read the names -
CIRCLE, TRIANGLE, SQUARE and RECTANGLE. 2. match a written name to the appropriate shape. | | | | | | |

50. KCOSA:	APPLE BBC RML SPECTRUM	To display $A \cos x$, $B \sin x$ and their sum on a blackboard or overhead projector is tedious. This program may be used by the teacher to display quickly:
H Grade Mathematics		1. the graph of $A \cos x$ and $B \sin x$ (A, B selected by the user) 2. the graph of $f(x) = A \cos x + B \sin x$ showing its sinusoidal nature 3. expression of $f(x)$ in one of the following forms: $k \cos(x + c)$, $k \cos(x - c)$, $k \sin(x + c)$, $k \sin(x - c)$ 4. the maximum value of f 5. indication of the significance of the angle 'c' when $f(x)$ is expressed in one of the forms listed above.
51. MASS SPECTROMETER:	APPLE BBC	The program builds up a simplified diagram of the mass spectrometer - under the teacher's control and with a brief explanation of each stage. The program finally simulates the counting of a sample of magnesium containing 3 isotopes. These results are given in table and graphical form. The option is then given for the computer to show the calculations.
O/H Grade Chemistry/Physics		
52. NEUTRALISATION BY CONDUCTIVITY MEASUREMENT:	APPLE BBC	The reasons for changes in conductivity during neutralisation reactions are not always understood by pupils. When discussing the results of experiments, it is useful to have a dynamic model available to remind them of the results obtained. It is also advantageous to have a model showing the ions present at different stages of the reaction.
O Grade Chemistry		This program illustrates in terms of ions present the conductivity changes in the following neutralisation reactions: 1. hydrochloric acid and sodium hydroxide 2. sulphuric acid and barium hydroxide 3. sulphuric acid and copper oxide.
53. POND ANIMALS:	APPLE BBC RML	Like 'Leaves' (above) this program provides a quick and simple means of using a paired statement key by focussing the pupil's attention on one pair of statements at a time and by automatically moving on to the next pair of statements appropriate to the pupil's response. In this case, a pond animal is identified.
Primary 6-7 Secondary 1-4 Environmental Studies/ Biology/Integrated Science		
54. QUADRATICS:	APPLE BBC RML SPECTRUM	This program is designed for use by the teacher in class demonstrations. It may be used to:
O Grade Mathematics		1. draw the graph of any quadratic function; 2. draw, on the same diagram, the graphs of a series of quadratic functions e.g. (a) $2x^2 + 3x + 1$, $2x^2 + 5x + 2$, $2x^2 + 3x + 3$, ... (b) x^2, $2x^2$, $3x^2$, ...; 3. find - the zeroes of a quadratic function, - its axis of symmetry (which may be drawn), - the turning value and its nature, - and the intersection with the y-axis. If more than one curve is displayed, points of intersection are also calculated.
55. RAMTEST:	BBC	Ramtest provides the facility to test RAM for failed chips as an aid to maintenance.
----- Diagnostics		
56. SPACE ADVENTURE:	APPLE BBC RML SPECTRUM	This package offers practice in addition and subtraction; it also reinforces and clarifies the concepts of:
Secondary Remedial Arithmetic		1. carrying 2. grouping of numbers 3. decomposition Success is rewarded with a game of "Space Adventure".
57. STROBED MISSILE:	BBC	The program enables the teacher to make clear the importance of selecting an appropriate flash rate for stroboscopic photographs. It permits the independence of vertical and horizontal motions to be illustrated. Muzzle velocity, vertical acceleration, flash-rate and length of fall may be independently varied to illustrate how one factor interacts, or does not interact with another.
O/H Grade/ 6th year studies Physics		

58. TABLE WORMS	APPLE BBC RML SPECTRUM	This package offers plenty of practice in using the two to ten times tables, the meaning of the product being reinforced when an error is made. Interest is sustained by alternating tables practice with a game of shooting down table worms.
Secondary/Remedial Arithmetic		
59. TAKE AWAY: Infants/Remedial Mathematics	BBC	This program shows in a simple way the 'take away' aspect of subtraction rather than the comparative aspect shown in 'Difference' (above). It illustrates one meaning of the '-' symbol and how a 'take away' problem can be recorded. It also gives children practice in counting the number of objects in a set.
60. TRACE: P1/Remedial Mathematics	BBC	Use of the program should help children to associate a numeral with: 1. the cardinality of a set 2. its number name The program should also provide practice in the formation of numerals by tracing a numeral with his finger on the screen, following 'shading in' of the numeral. The question 'how many?' is not asked. Teachers wishing the children to respond to the question 'how many?' should refer to 'Count' (above).
61. TRIGONOMETRIC GRAPHS: O/H Grade Mathematics	APPLE BBC RML SPECTRUM	The program was written to facilitate the comparison of the period and range of functions of the form: $y = a \sin bx^{\circ} + c \quad \text{and} \quad y = a \cos bx^{\circ} + c$ by drawing graphs of the functions; the program will also: 1. calculate the minimum period 2. calculate the range of the function and 3. superimpose one function on another (at most 3 functions per graph).
62. DRAG RACE: Secondary Remedial Arithmetic	APPLE BBC RML SPECTRUM	Remedial pupils need regular practice at division to develop skills; motivation may be lacking and the program offers this motivation and also illustrates the concept of division when errors are made. This package aims to give practice in simple division where the answer is a whole number and to demonstrate the significance of the operation when a wrong answer is given. Scores are kept and success is rewarded with a game of Drag Race.
63. HABER ECONOMY: O Grade, H Grade and CSYS Chemistry	BBC	This program was designed to demonstrate the role of Chemistry in industry by looking at the many factors which affect the production of ammonia. It permits the study of the effect of varying pressure, temperature, flow rate and gas mixture on the rate of production of ammonia. Daily profit/loss is calculated and at the end of term, the factory is sold and the group's management skills are displayed.
64. RADIOACTIVE CHIPS: H Grade and FE Chemistry	PET	The objective of this package is to give the student an opportunity (in a lighthearted way) for familiarisation with the idea of exponential decay. Within the framework of a gambling game, the user is given initial activity, half life and elapsed time and has to guess the remaining radioactivity.
65. ESTERIFICATION: FE Chemistry	PET	This program follows esterification in a stepwise animation with emphasis placed on the fact that a shared pair of electrons constitutes a covalent bond. There are four sections detailed in the program: Protonation of the acid, Electrophile attack on alcohol, Proton transfer and Deprotonation.
66. ELECTRONIC CONFIGURATION: FE Chemistry	PET	Before full understanding of bonding or hybridisation can be achieved, it is essential that students are able to write out electronic configurations for atoms. The program gives practice in writing out configurations of the first twenty-five elements and helps understanding of degeneracy of orbitals.
67. FREE RADICAL HALOGENATION OF METHANE: FE Chemistry	PET	Students should be aware of the mechanisms by which reactions occur. The program demonstrates: 1. Homolytic Fission 2. Radical formation requires heat or light 3. Hydrogen abstraction 4. Collision geometry 5. Difficulty of removing third and subsequent hydrogen atoms

68. POLYMERISATION: FE Chemistry	PET	The objectives of this package are to "see" a two-dimensional polymerisation, to supply reasonably realistic molecular weight of polymers, to study chain length distribution with time of polymerisation and the degree of polymerisation with time.
69. BORN HABER FE Chemistry	PET	This is a demonstration program to illustrate the various steps undergone in the formation of an ionic solid.
70. NMR SPECTRA FE Chemistry	PET	This program is of a remedial nature to help students interpret simple spectra. It is designed to aid recognition of protons by their chemical shifts and to help understanding of the connection between the signal splitting and the number of neighbouring protons. It also helps the user to appreciate that the area under a peak is related to the number of protons in a particular environment.
71. AVOGADRO & THE MOLE: (Modules 1 - 4) FE Chemistry	PET	Students frequently have difficulty in solving problems involving Avogadro's number and the mole with facility. The series of programs is designed to help with this and to provide some insight into the size of Avogadro's number.
72. ACID TITRATION: FE Chemistry	APPLE	This package aims to reinforce the student's identification of the equivalence points as the volume associated with the maximum gradient of the potential versus volume curve. It also develops the skill of approaching the equivalence point rapidly by watching the changing gradient of the curve and it gives practice in accurately determining equivalence volume and in simple volumetric calculations. In addition, it aims to familiarise the user with the shapes of weak acid versus strong base titration curves.
73. VIBRATIONS: FE Chemistry	APPLE	The program is designed as an aid to the teaching of elementary spectroscopy associated with vibrations. It attempts to assist the student to visualise certain types of vibration, recognise the terms used in describing vibrations and to appreciate which vibrations are active in the infra-red region of the spectrum.
74. SN2 MECHANISM: FE Chemistry	APPLE	This aims to assist students to appreciate how a reaction rate can depend on two reactants and how inversion can occur. The program is designed as an aid to the imagination and is best used with or following an introduction to the SN2 mechanism in organic chemistry.
75. SPECTRA OF DIATOMIC MOLECULES: FE Chemistry	APPLE	With reference to diatomic molecules, the program attempts to assist a student to understand how spectral lines arise, the relationship between line frequency and energy level differences and the effect of selection rules on the spacing of spectral lines.
76. TITRATION OF WEAK ACIDS: FE Chemistry	APPLE	The program is designed to assist understanding of pH solutions with particular reference to partially neutralised weak acid (buffer solution) and fully neutralised weak acid (weak acid - strong base salt solution). It also complements instructions on the selection of acid-based indicators.
77. ABSORPTION OF LIGHT: FE Chemistry	APPLE	The program is designed as an introduction to the use of Beer's Law in analysis of solutions. It is probably best used to complement a laboratory experiment in this subject.
78. MOLECULAR GRAPHICS: FE Chemistry	APPLE	This program allows representations of molecular structure to be rotated and scaled in order to obtain a projection appropriate to any viewpoint.

These programs are all held by Regional distribution centres throughout Scotland. Please contact SMDP for the addresses of these Centres.

S Clark
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SMDP
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SCEMP SOFTWARE: PROGRAMS AVAILABLE ON THE APPLE II MICROCOMPUTER

(All these programs are held at Scottish Regional Distribution Centres.
They can be used by a complete beginner. The instructions
appear on the screen as the user is led through the program.)

LIFE/SOCIAL SKILLSHealth Matters

by SCEMP

This program helps you to assess your risk of a heart attack, and looks at the effect of diet on your health.

Sniffing Glue - and other solventsby Scottish Microelectronics Development Programme
and The Greater Glasgow Health Board

This program tries to survey the problem of solvent abuse and allows you to compare your attitude to it with the reactions of a group of teenagers.

Rise and Shineby the Scottish Microelectronics Development Programme
and The Scottish Health Education Group

A program which helps you to realise that how you rise in the morning affects how you feel and your relationship with others for the rest of the day.

Food and Your Health

by SCEMP

Does what you like to eat compare to what you should eat? Use this program to find out!

Alcohol and Health

by Argyll and Clyde Health Board in collaboration with SCEMP

The program shows how it is possible to drink socially without ill-effects. There is particular emphasis on the amount that you can sensibly drink without your health being harmed.

Cystic Fibrosis/Health

by SCEMP

This is a program mainly for children of about 7 and over who have cystic fibrosis. It encourages them in an amusing way to think about their diet.

BASIC LITERACYWhat Day is it?

by SCEMP

Using a well-known rhyme, this program makes learning how to use a calendar fun.

QUIZZESSports Quiz

by Bishopbriggs High School

There are ten options: Badminton; Basketball; Bowls; Cricket; Soccer; Rugby League; Rugby Union; Golf; Hockey; Ice Hockey. You choose one sport and answer ten true/false questions. Your percentage score is given at the end.

Road Safety Quiz

by Stuart Roebuck

This program allows you to choose questions on a topic or on a combination of topics (from a list of 17, e.g. Pedestrians, Motorcycles, Parking). Your percentage score is given at the end of each set of 10 true or false questions. (The program allows adaptation to other subject areas.)

Beat the Moneygrabbers

by the Clydesdale Bank Ltd.

The Moneygrabbers are after your pile of cash, and only your Clydesdale knowhow will enable you to exterminate them in time. You select an easy or a difficult quiz, and if you answer correctly and quickly you win the game. The graphics illustrate the state of play throughout.